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Dear Dr. Young and Ms. Lynch:

Enclosed is the DEP Response to the NYSDOH/USEPA Comments on Revised 2007 FAD Deliverables submitted through March 2016.

As always, if you have any questions about these comment responses or other aspects of the City's watershed protection efforts, please do not hesitate to contact me.

Sincerely,

David S. Warne
Assistant Commissioner

DEP Response to NYSDOH/USEPA Comments on the FAD Deliverable Reports Submitted March 31, 2016

Response Date July 7, 2016

4.5 Watershed Forestry Program

The Revised 2007 FAD required DEP to evaluate the implementation status of the five-year-old WAC forest management plans. The evaluation of the WAC forest management plans that reached their five-year status in 2015 was completed by DEP and submitted to NYSDOH/EPA for review and comment.

The report provides valuable information about the history and evolution of the program; discusses programmatic successes and challenges; and justifies a recommendation by DEP to discontinue the current requirement (i.e., evaluation of the implementation status of five-year-old WAC forest management plans). The report indicates that, due to various factors (including periodic ownership changes, perpetual updates to the plans, and redundancy in assessments), implementation status could not be accurately evaluated, and the acquired analytical data were not useful. In addition, the fact that many landowners had to complete multiple surveys in the past few years threatens to result in 'landowner fatigue' and reluctance to participate.

Based on its assessment, DEP proposes that "next year's report mark the end of this particular FAD requirement." NYSDOH/EPA appreciates DEP's input and will revisit the issue during upcoming planning meetings for the 2017 FAD, in order to make a final determination regarding the adequacy of this particular deliverable.

DEP Response:

Comment noted.

Additional information/further clarifications are requested at this time:

On page 1, the report describes collaborative efforts with SUNY ESF in 2009-2011. Any reference to either the published results or the final report from this study will be appreciated.

DEP Response:

The research was published in the March 2013 issue of the Journal of Forestry, Volume 111, Number 2, pages 108-114. A link to the article can be found here: *Journal of Forestry March 2013*.

On page 5, the report states that three MAP projects have been cancelled by landowners. What were the reasons?

DEP Response:

The Watershed Forestry Program does not track reasons why individual landowners cancel specific MAP projects, in part because not every landowner provides a reason. However, for those landowners who have indicated reasons for cancelling projects over the years, reasons have included: inability to hire a forester or logger to complete the work; inability to complete the project in the time required (even though time extensions are granted); or the simple fact that other

priorities got in the way and/or landowners changed their minds about their projects. It is not uncommon for landowners to cancel MAP projects – of the 648 projects approved to date, landowners have canceled 87 projects (13%). Put another way, more than 85% of approved projects are completed, which is a very positive statistic.

DEP wrote that meeting a metric of "x" amount of forest plans per review period has become problematic for a number of reasons. What other metric(s) would better capture the success of the program? Some examples might be: number of implemented BMPs (as is now done); total acreage; or total length of logging road repaired and/or relocated?

DEP Response:

It is not problematic to continue reporting on forest management planning accomplishments for a specific time period, such as number of plans completed per year or acreages enrolled in these plans; these statistics are relatively straightforward to track and report each year, along with additional statistics such as length of logging roads repaired/relocated if that information is helpful. The problem cited in DEP's report involves tracking, reporting and evaluating cumulative planning accomplishments over long periods of time due to the issue of multiple landowners developing multiple plans on overlapping parcels – this creates database redundancies and inconsistencies which in turn complicate long-term analyses. Historically, the Forestry Program has never been required to meet specific numeric metrics for plans or projects completed in a given year due to the voluntary nature of these programs and the uncertainty of predicting future interest or participation from one year to the next. However, the program continues to be funded at a sufficient level that meets historic demand and allows the program to match or exceed average annual completion rates for both forest management plans and BMP projects.

Are any complaints ever registered with DEP related to poor forest harvest management?

DEP Response:

No, complaints are generally not registered.

What forestry practices does DEP regard as the most important in relation to water quality protection?

DEP Response:

In terms of BMPs, DEP generally considers the proper design and layout of forest access roads and forestry stream crossings to be the most important for water quality protection; the use of temporary stream crossings (such as portable bridges and arch culverts) and BMPs that control soil erosion (such as geotextile fabric and traditional pipe culverts) are particularly important. In terms of forest management practices, DEP generally considers silvicultural activities that maintain a diverse, healthy and vigorously growing forest to be the most important for water quality protection; for example, MAP practices such as timber stand improvement or invasive species control are more likely to improve forest health (and contribute to water quality protection) compared to practices such as wildlife habitat improvement or tree planting.

4.6 Stream Management Program

The Revised 2007 FAD requires DEP to "complete construction of seven stream management projects within the Ashokan basin with a goal of protecting water quality, in particular by reducing turbidity". Annually, by March 31 of each year, NYCDEP must submit brief descriptions of proposed projects and anticipated timelines for completion. NYCDEP submitted a letter dated February 25, 2016, describing three water quality-driven stream projects within the Ashokan basin: one project on the Stony Clove Creek near Wright Road, and two projects on the Beaver Kill near Van Hoagland Road.

NYSDOH/USEPA and NYSDEC reviewed the information provided in the letter, and NYSDOH visited the proposed project locations. We agree that these projects meet the goal of protecting water quality, in particular by reducing turbidity, and should be counted toward the seven projects required by the Revised 2007 FAD.

DEP Response:

Comment noted.

5.2 Multi-Tiered Water Quality Modeling Program

NYSDOH/EPA note that DEP climate change modeling had begun using a "bottom-up" approach and investigated the use of Synthetic Weather Generators (SWGs). This is the logical next step after system vulnerabilities were identified in the Water Research Project 4262. However, that was a pilot study where potential increased future water demand was a major driver. System vulnerabilities can also be identified from stakeholders and more traditional "top-down" approaches. How will DEP define system vulnerabilities moving forward?

DEP Response:

DEP will continue to use the top-down approach to modeling specific events or time series of weather and hydrologic conditions that are of interest. At the same time, DEP will explore the use of the bottom up approach. We do not expect that either approach will be abandoned. We will try to glean useful information from each.

NYSDOH/EPA request the following clarifications:

Wilby and Dessai's (2010) Cascade of Uncertainty (Figure 1) shows that uncertainty increases when downscaling from emission scenarios to local climate and adaptation. How does "bottom-up" enable more quantifiable and flexible definitions of uncertainty?

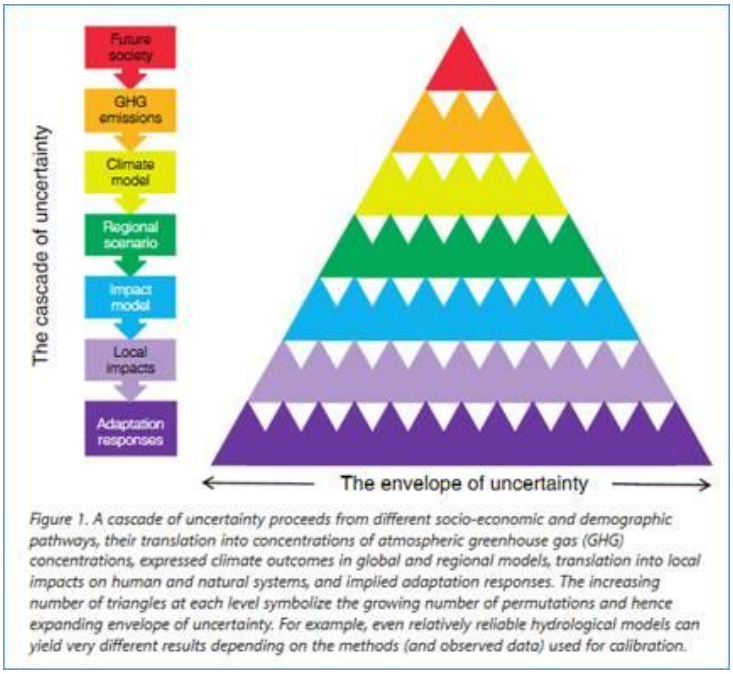

Figure 1. Wilby and Dessai. 2010. *Weather* 65(7):180-185.

DEP Response:

The bottom up approach provides a platform to include all sources of uncertainty, and to explicitly state and define how the sources of uncertainty were estimated. The bottom up approach does not provide any additional capability in defining uncertainties, but rather provides a platform to communicate uncertainties.

How are SWGs expected to better represent future extreme weather events over change factor methods? "Top-down" climate predictions can be defined as "plausible climate change scenarios". How does this relate to the skill (accuracy) of SWGs?

DEP Response:

Synthetic weather generators provide a method of interpreting each of the GCM-based "plausible climate change scenarios" in terms of probabilistic information about extreme events. This is much more applicable for DEP's decision making process than a statement of average conditions.

How does the probability of future events/projections/vulnerabilities play into sensitivity analysis and uncertainty?

DEP Response:

As mentioned in the previous bullet, SWGs enable probabilistic information about extreme events that would be more difficult or impossible to estimate with only observed data. With the synthetic weather data generated using a stochastic procedure, the probability of extreme events can be estimated.

The work on West of Hudson reservoir residence times and the revised bathymetric data are useful tools. We look forward to similar work on the East of Hudson reservoirs, as this could be valuable information for TMDL work.

DEP Response:

Comment noted.

We are pleased to see the WRF Project 4422 work regarding characterization of NOM and DBP control under dynamic weather conditions has progressed, and note the importance of exploring both regulated and unregulated DBPs. Have the optical properties been used to estimate more traditional parameters such as UV254 and SUVA?

DEP Response:

UV_{254} and SUVA (ratio of UV_{254} to DOC) are single-wavelength measures of UV absorbance. Previous studies have investigated the estimation of DBP FP from these optical properties. In part, WRF Project 4422 focused on the use of spectral absorbance (over a range of wavelengths) to predict DBP FP. Estimation of DBP FP was moderately improved using measures of spectral absorbance.

NYSDOH/EPA look forward to the results from WRF Project 4590 (wildfire impacts on forests), particularly as it relates to disinfection byproduct work.

DEP Response:

Comment noted.

We note the Modeling Program's numerous collaborations, conference presentations, and journal publications. It is good to see that the extensive data collected under the FAD are being shared and used to frame and answer broad-based basic scientific questions. The effects of climate change on early spring runoff and lake productivity are particularly interesting and important to the interpretation of findings from the DEP's initial "top-down" climate change work.

DEP Response:

Comment noted.

8.1 Waterborne Disease Risk Assessment Program

The annual report for the Waterborne Disease Risk Assessment Program was submitted as required by the Revised 2007 FAD. The report provides valuable information about the status of the program, describes data collected during 2015, and concludes that during the reporting period there was no evidence of a drinking water-related outbreak in New York City.

DEP Response:

Comment noted.